

FARMING THE SEAS

Dr. BRAD HICKS

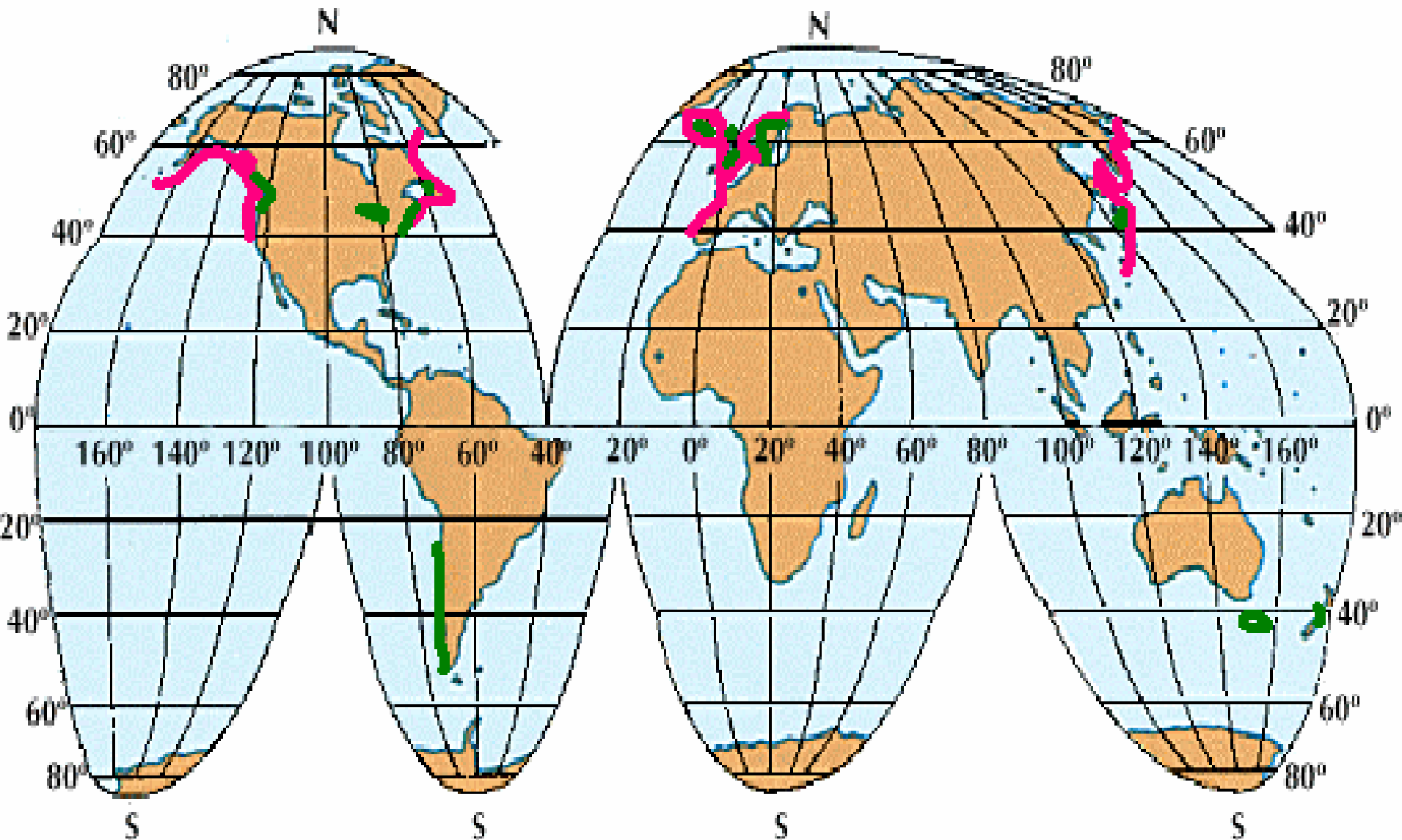
AQUANET



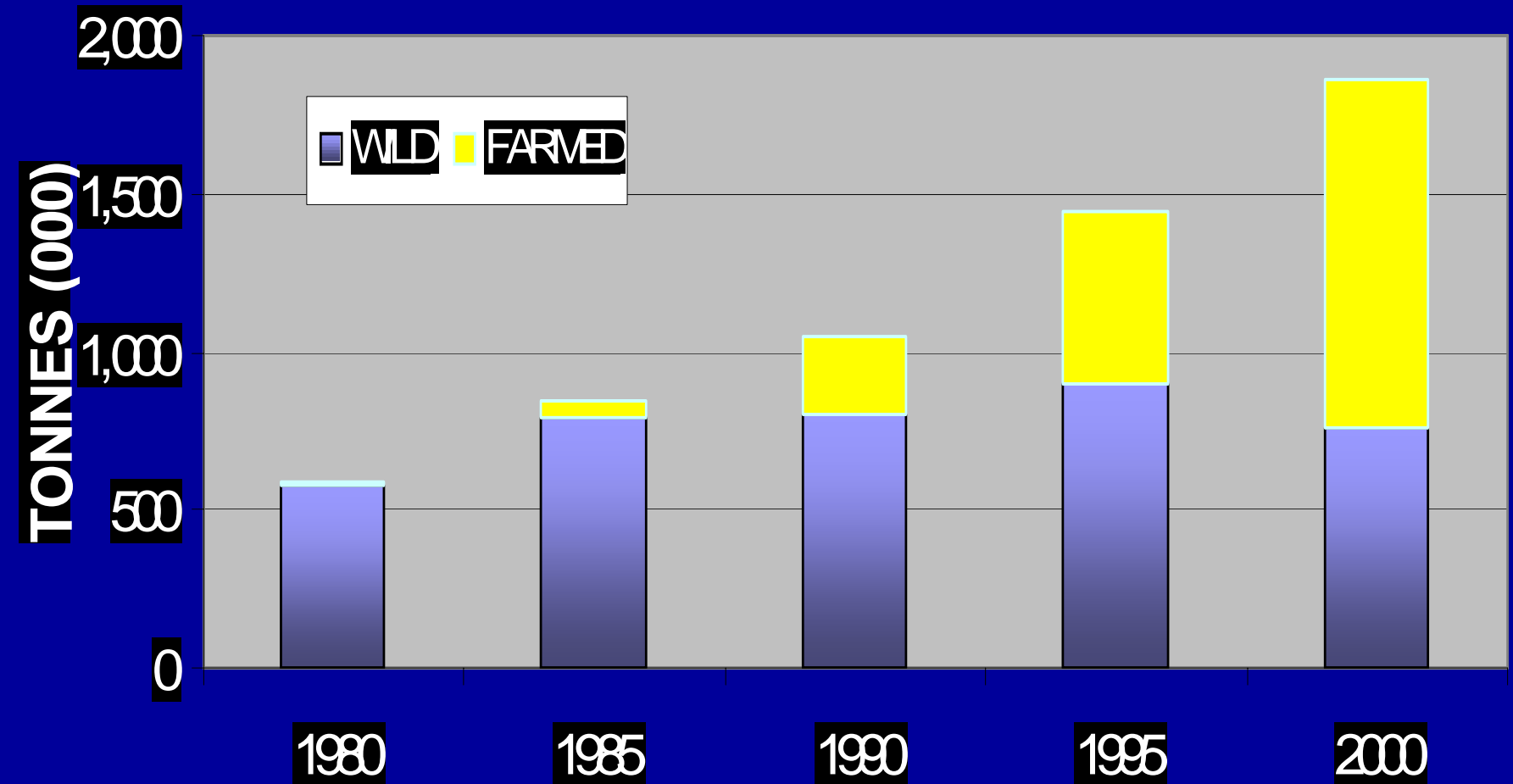
WORLD SALMON FARMING /WILD AREAS

WILD 

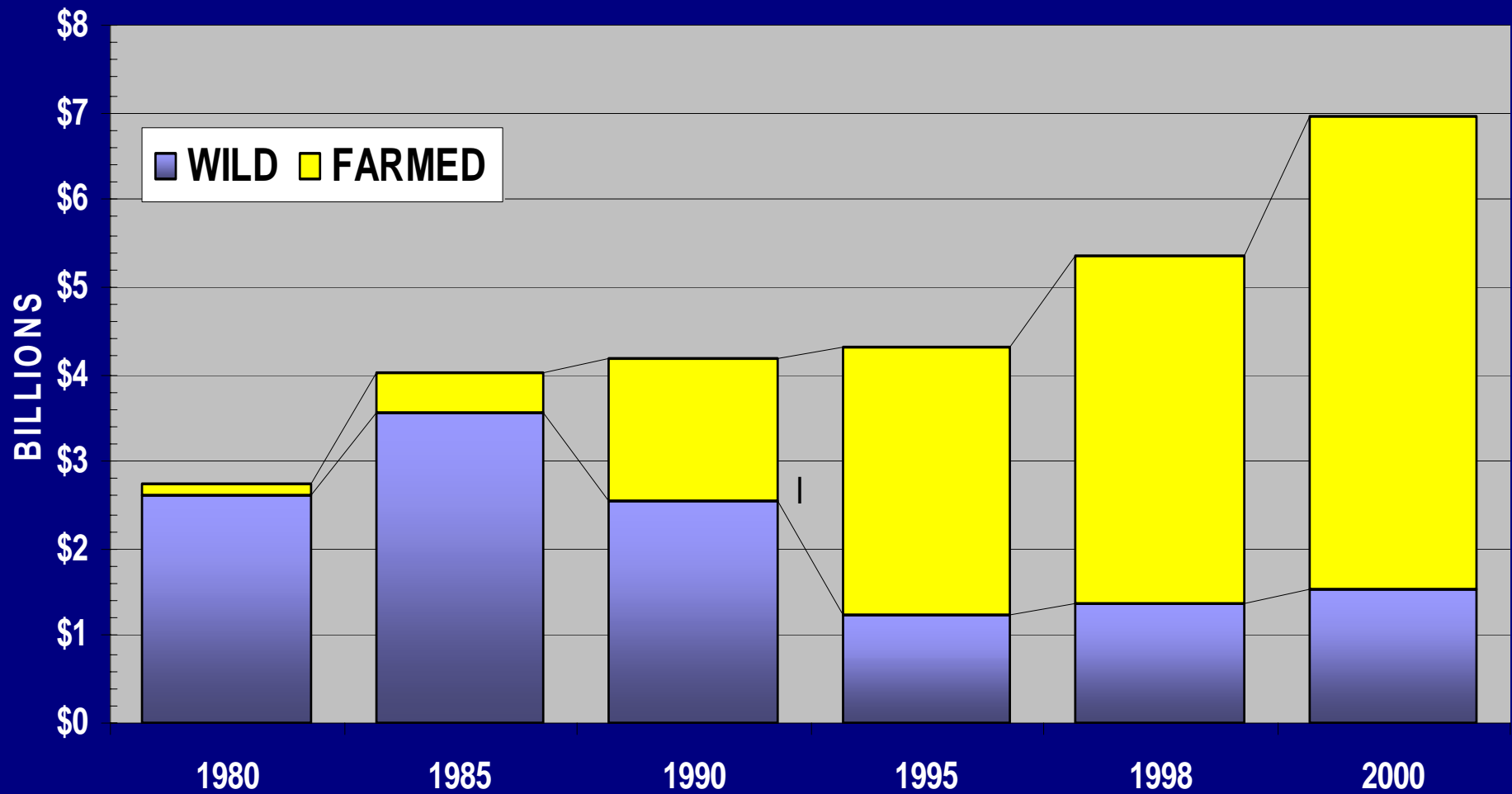
FARMED 



WORLD SALMON SUPPLY



WORLD SALMON VALUE



WORLD PRODUCTION

• Norway	450,000
• Chile	380,000
• United Kingdom	140,000
• North America	100,000
• Faeroes Islands	80,000
• Others	50,000

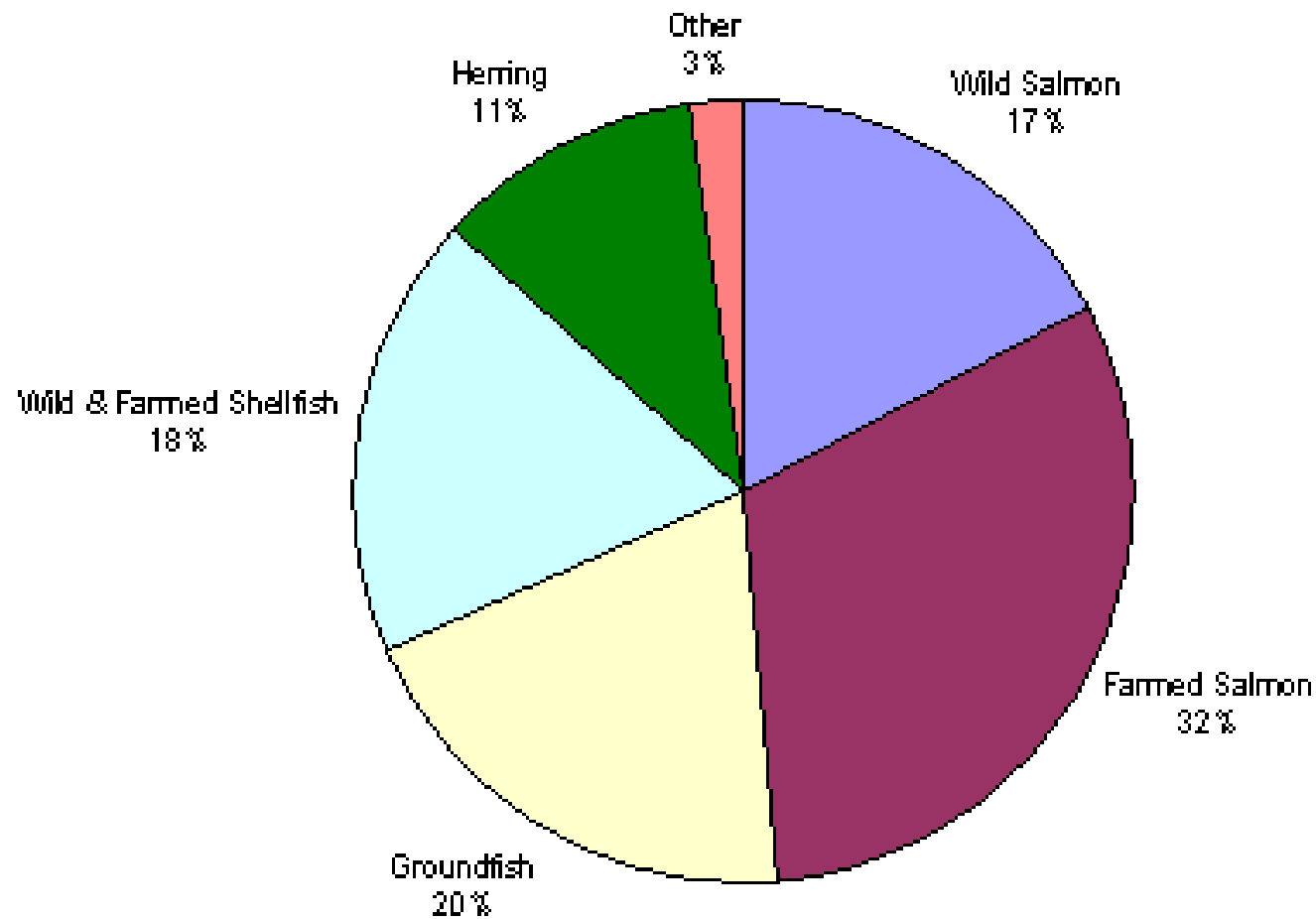
Current North American Production

- **75,000 – 100,000 Tonnes Canada**
- **20,000 - 25,000 Tonnes USA**
- **95,000 – 125,000 Tonnes**
- **220 million pounds - \$440 million**
- **Production in North America represents approximately 9% of the worlds farmed salmon production of 1,200,000 Tonnes**

Wholesale Value Share by Major Species Group - 2002

(includes fish imported for value added processing in BC)

(\$1,147 Million)



EMPLOYMENT OPPORTUNITIES



Local Employment for all types of workers

Year round employment

This makes aquaculture a very good business
for coastal communities



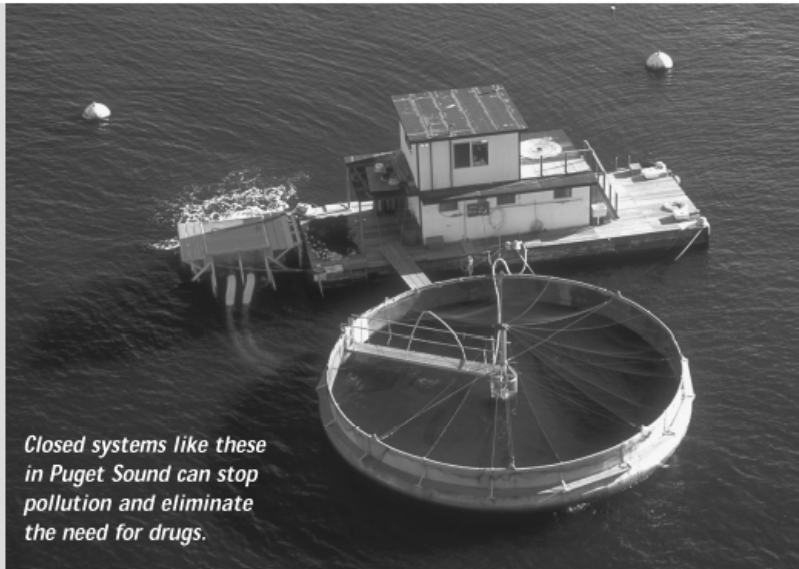
FEAR OF FOOD

[HUMAN HEALTH AND THE SURVIVAL OF B.C.'S WILD SALMON ARE AT STAKE]

Is Your Fish Dinner Laced with Drugs?

Netcage Salmon Farms Can Infect B.C.

Powerful antibiotics are routinely used to battle disease outbreaks in open netcage fish farms — the same drugs used to treat human infections. But dumping these drugs into open cages speeds the growth of drug-resistant microbes that can't be treated. Humans can "pick up antibiotic-resistant bacteria by eating farmed salmon," says University of B.C. microbiologist Dr. Julian Davies.



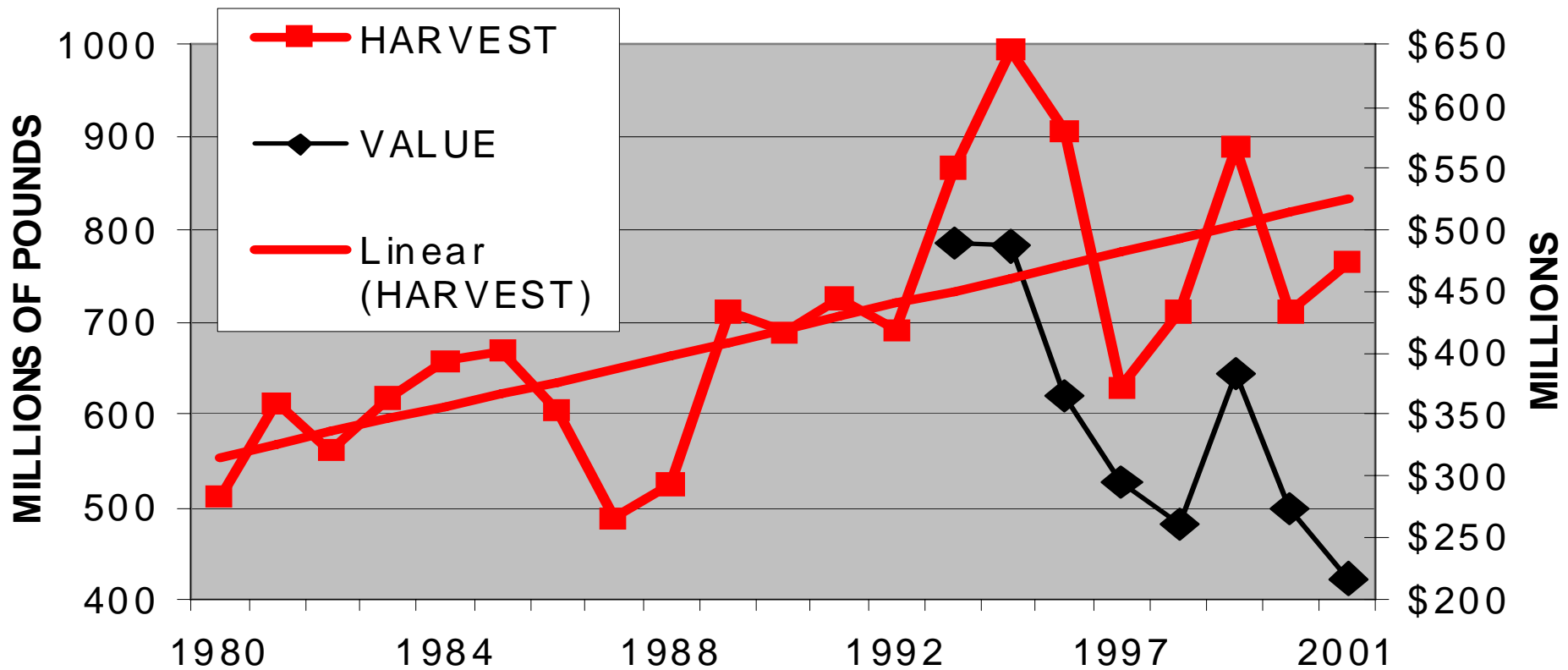
Closed systems like these in Puget Sound can stop pollution and eliminate the need for drugs.



NOT EVERYONE
LIKES THE IDEA
OF FISH FARMING

High levels of wild production and competition from farmed fish have resulted in decreased value.

ALASKAN SALMON FISHERY



OCEAN - FISHERY COMPLEX



COMMON PROPERTY

- **GENERATES WEALTH**
- **GENERATES POWER**

WHO HAD THE WEALTH AND POWER ?

1) Commercial Fishermen (traditional)

- **traditionally had most of the wealth and power**

2) Sports Fishermen (traditional)

- **shared the power with commercial fishermen**

3) First Nations (renewed tradition)

- **recently acquired some of the wealth and power**

4) Environmentalists (new)

- **have acquired a lot of power recently and some wealth**

5) Aquaculturalists (new)

- **have gained wealth and are struggling to gain power**

HOW ARE THE WEALTH AND POWER BESTOWED ?

COMMERCIAL FISHERMEN - Licenses

SPORT FISHERMEN - Licenses

FIRST NATIONS - Constitution

CONSERVATIONISTS – Fisheries Act, Oceans Act

AQUACULTURISTS – Bank Act

THINGS
ARE
CHANGING !





Commercial fishermen protesting the emergence of the aboriginal fishery

PRESENT RANKING

OLD

COMMERCIAL FISHERMEN
SPORT FISHERMEN
FIRST NATIONS
CONSERVATIONISTS
AQUACULTURISTS

NEW

CONSERVATIONISTS, DFO
FIRST NATIONS
SPORT FISHERMEN
COMMERCIAL FISHERMEN
AQUACULTURISTS

HOW ARE THINGS BEING CHANGED?

Supreme court decisions

Sparrow – west coast, Marshall - east coast

Buy back of commercial fishermen's licenses

Atlantic salmon east coast – Pacific salmon west coast

Environmental activism

Has driven the conservation agenda in DFO

Fishfarming becoming established

Many coastal communities rely on fish farming for their well-being

CONFLICT WITH FIRST NATIONS



AHOUSAHT BAND COUNCIL

General Delivery
Ahousaht, B.C. V0R 1A0
Phone, (250) 670-9563



NOTICE OF EVICTION

- 1 - Operating without a License.
- 2 - Infringement on our Aboriginal Rights Title , Section 35 (1) Constitution Act.
- 3 - Impacting the environment which is displacing our food gathering area.
- 4 - We are here by giving notice to evacuate immediately from our traditional territory.

AHOUSAHT FIRST NATION

Robert Mox
myr Chubb

“If the province won’t do its job then we will exercise our sovereign right and act on its behalf”

Sidney Sam Ahousaht
First Nations Chief Councilor

PARADIGM SHIFT FROM

THE MANAGEMENT OF A COMMON
PROPERTY RESOURCE WHERE THE
PRIMARY GOAL IS TO CONSERVE AND
PROTECT A LIMITED RESOURCE WITH
MINIMAL OR NO CONSIDERATION OF
PROFITABILITY – REQUIRING A
LOT OF GOVERNMENT

PARADIGM SHIFT TO

THE MANAGEMENT OF A PRIVATE
PROPERTY PRODUCTION SYSTEM
WHERE THE PRIMARY GOAL IS
PROFITABILITY AND THE CREATION
OF WEALTH WITH EXPANSION OF THE
PRODUCTION SYSTEM TO MEET
MARKET DEMAND –AND REQUIRING
LESS GOVERNMENT

Seafood Watch Seafood Report



MONTEREY BAY AQUARIUM®

Farmed Salmon Atlantic salmon (*Salmo salar*)




Robert Mazurek
Fisheries Research Analyst
Monterey Bay Aquarium

&

Matthew Elliott
Independent Consultant

Final Report
April 27, 2004

Table of Sustainability Ranks

	Conservation Concern			
Sustainability Criteria	Low	Moderate	High	CRITICAL
Risk of Escaped Fish to Wild Stocks				
Risk of Disease Transfer to Wild Stocks			✓	
Use of Marine Resources			✓	
Risk of Pollution & Habitat Effects			✓	
Effectiveness of the Management Regime		✓		

Overall Seafood Recommendation:

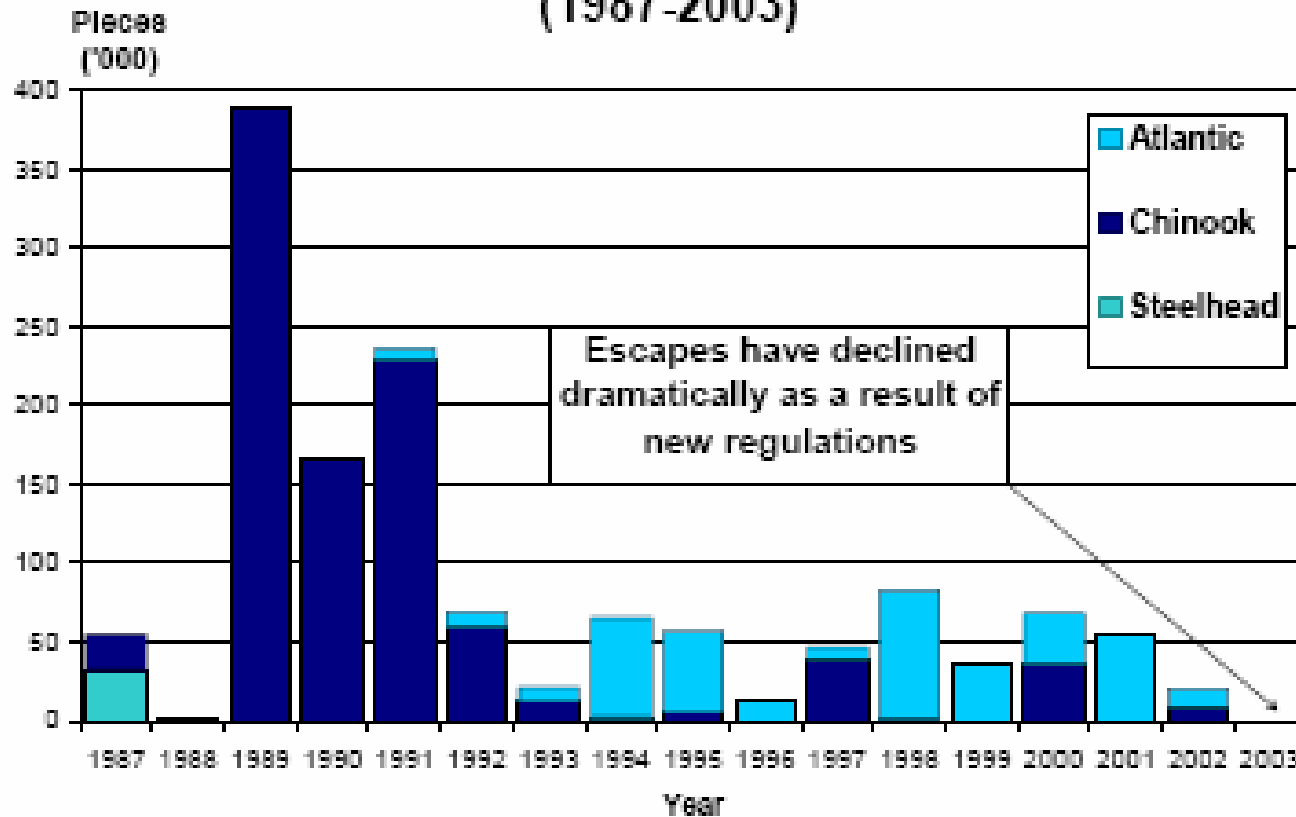
Best Choice 

Caution 

Avoid 

RISK OF ESCAPE - CRITICAL

Total Escapes from BC Marine Farm Sites
(1987-2003)



RISK OF ESCAPE - CRITICAL

FERAL ATLANTIC SALMON BC FRESHWATER

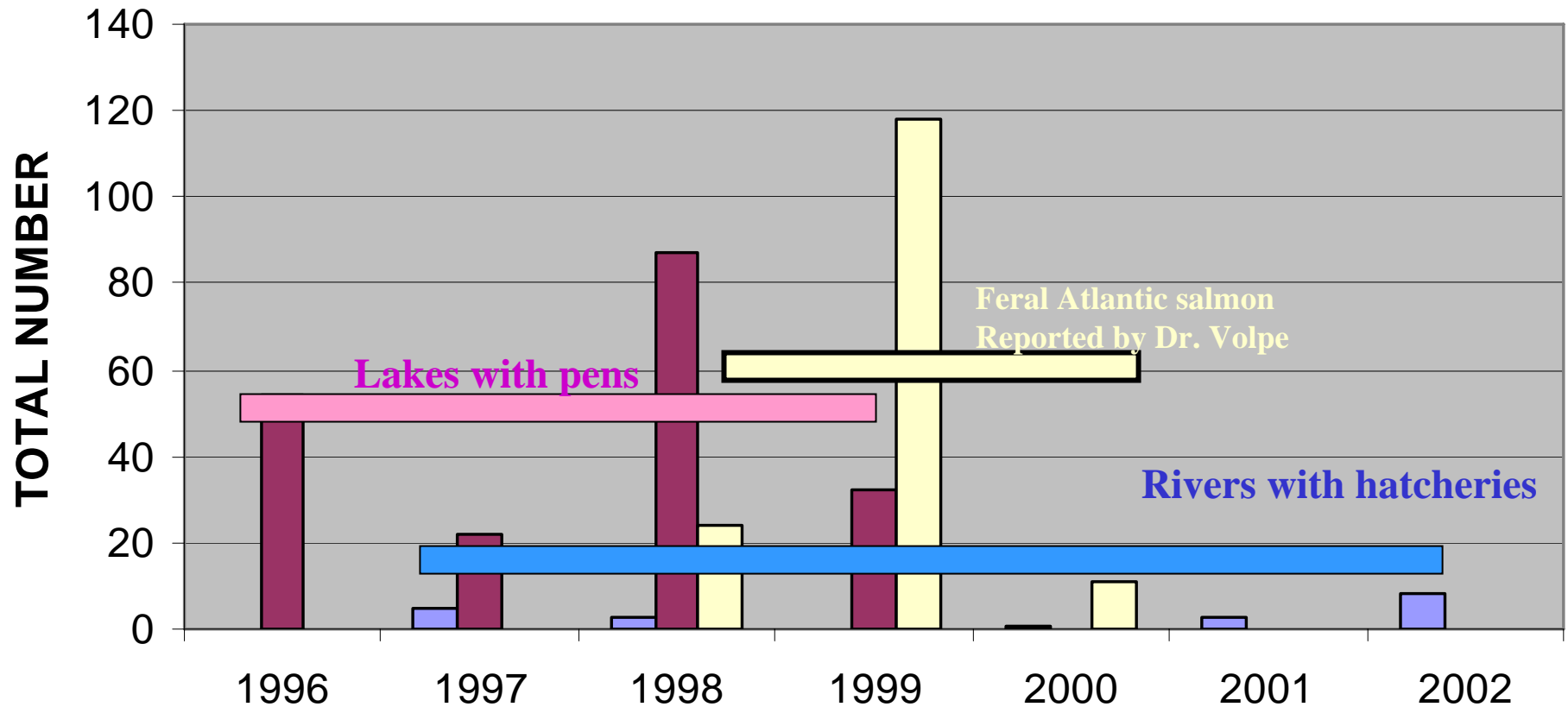



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RISK OF DISEASE TRANSFER TO WILD STOCK HIGH

**ADAMS RIVER
2002CENTURY
HIGH RUN**

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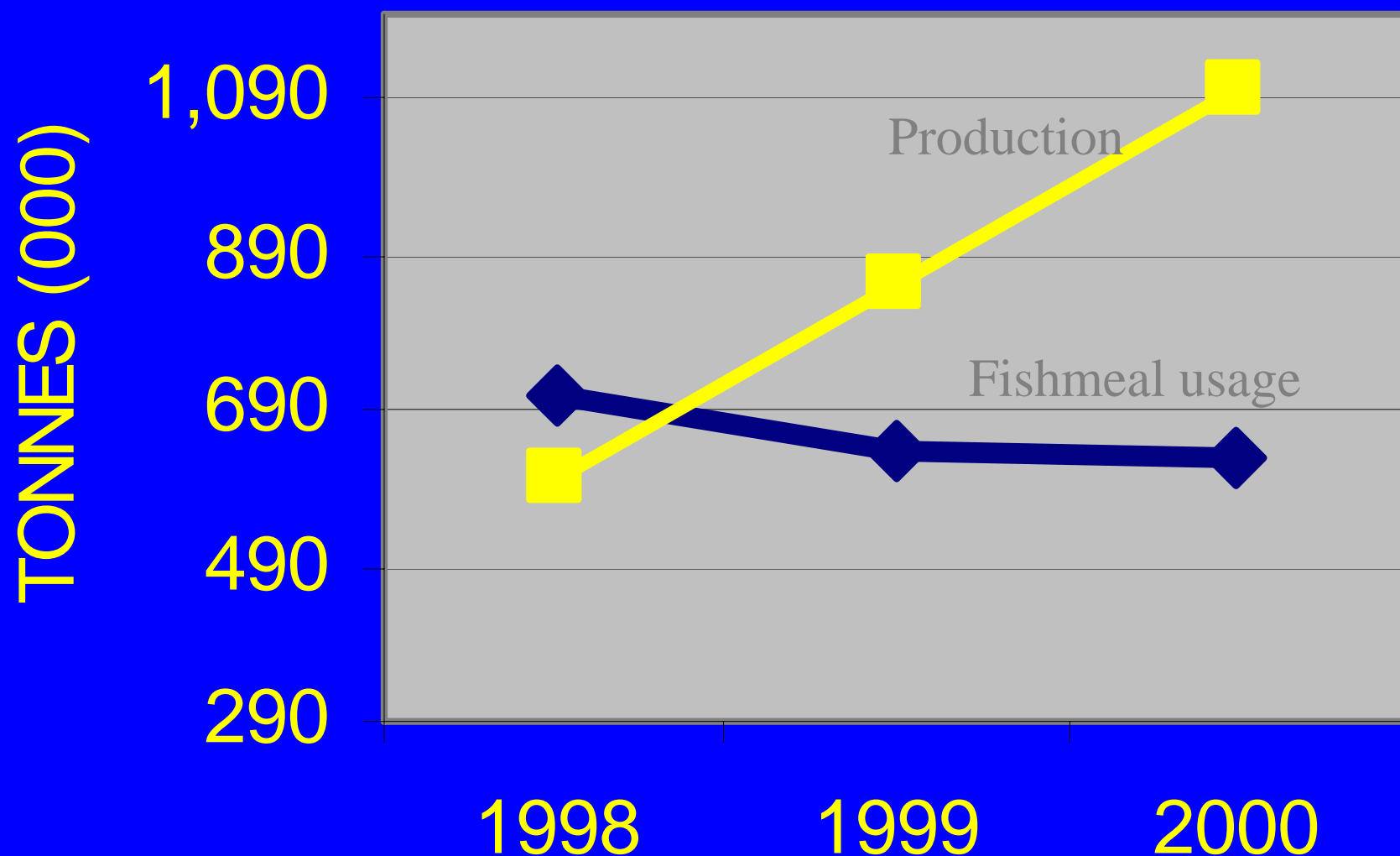
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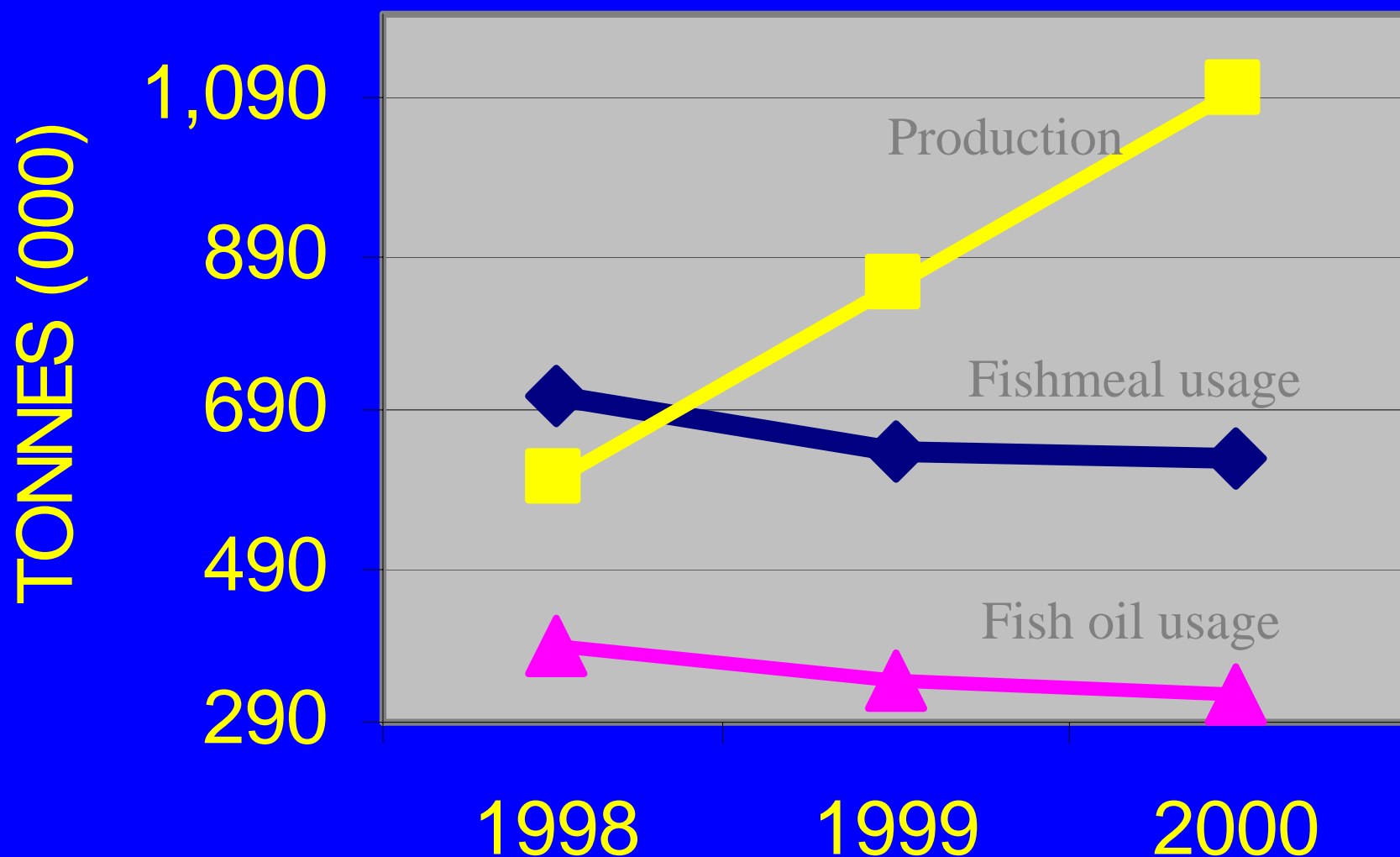
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SALMON PRODUCTION COMPARED WITH FISH MEAL USAGE



SALMON PRODUCTION COMPARED WITH FISH MEAL/OIL USAGE



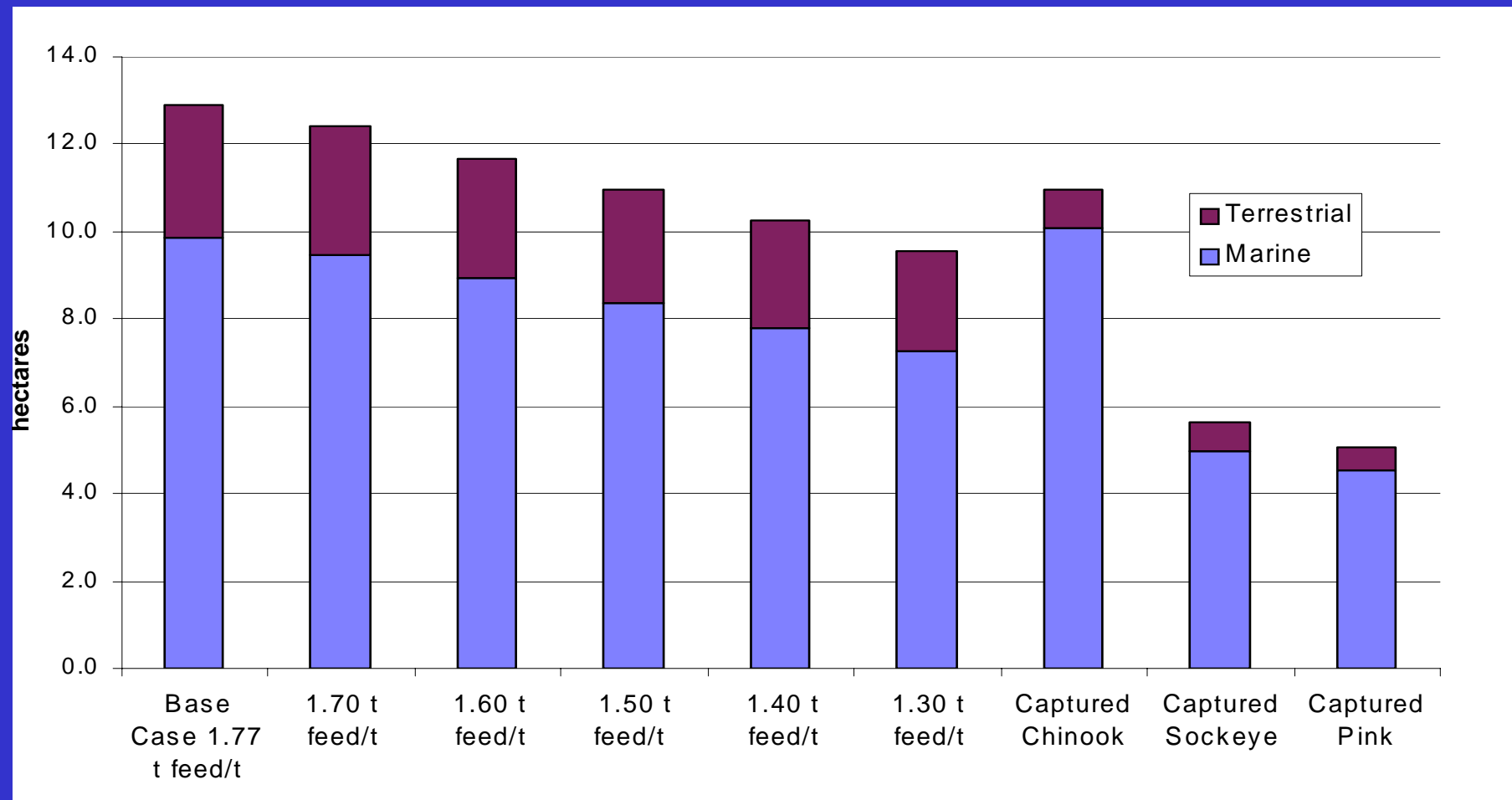
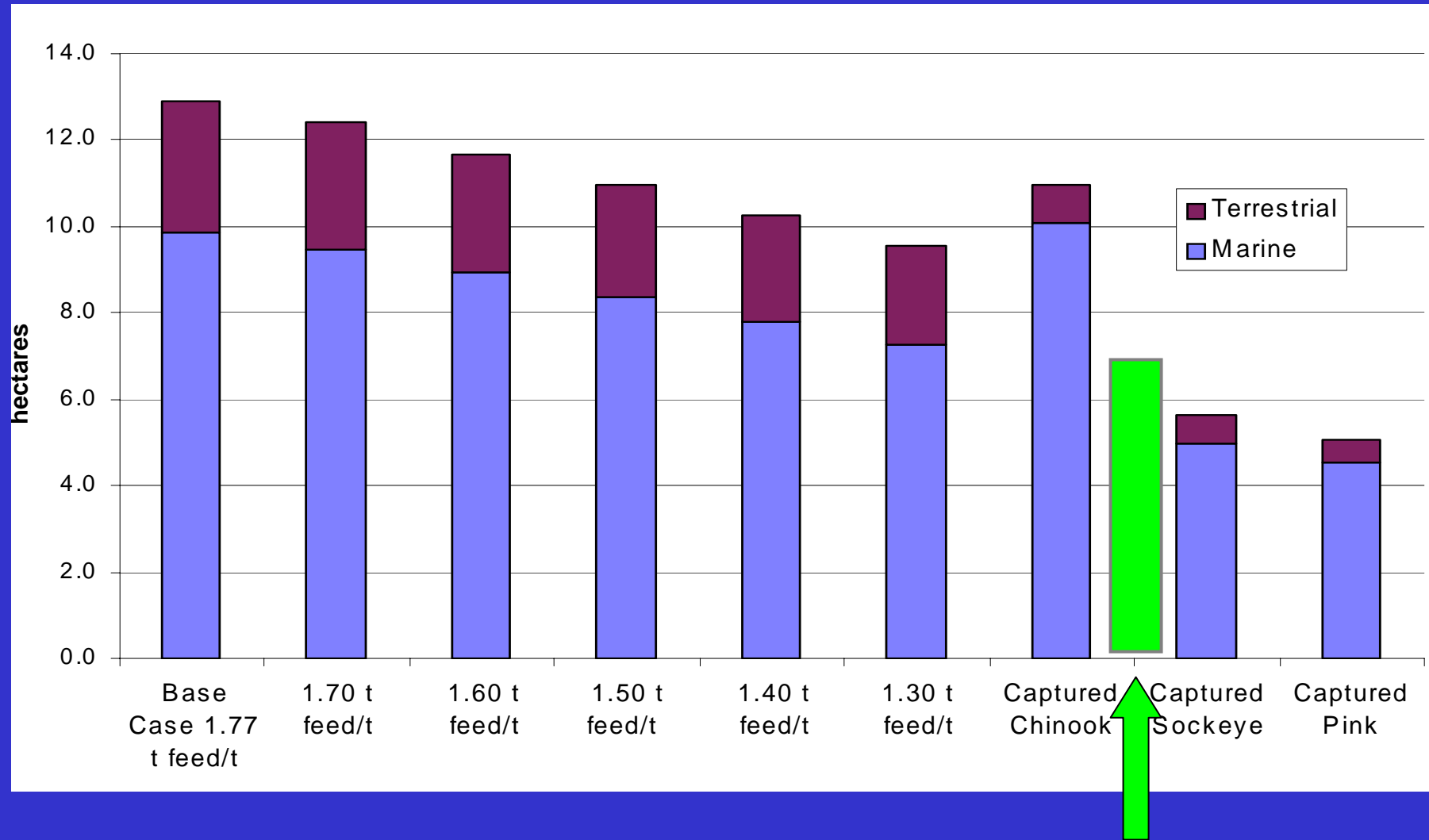


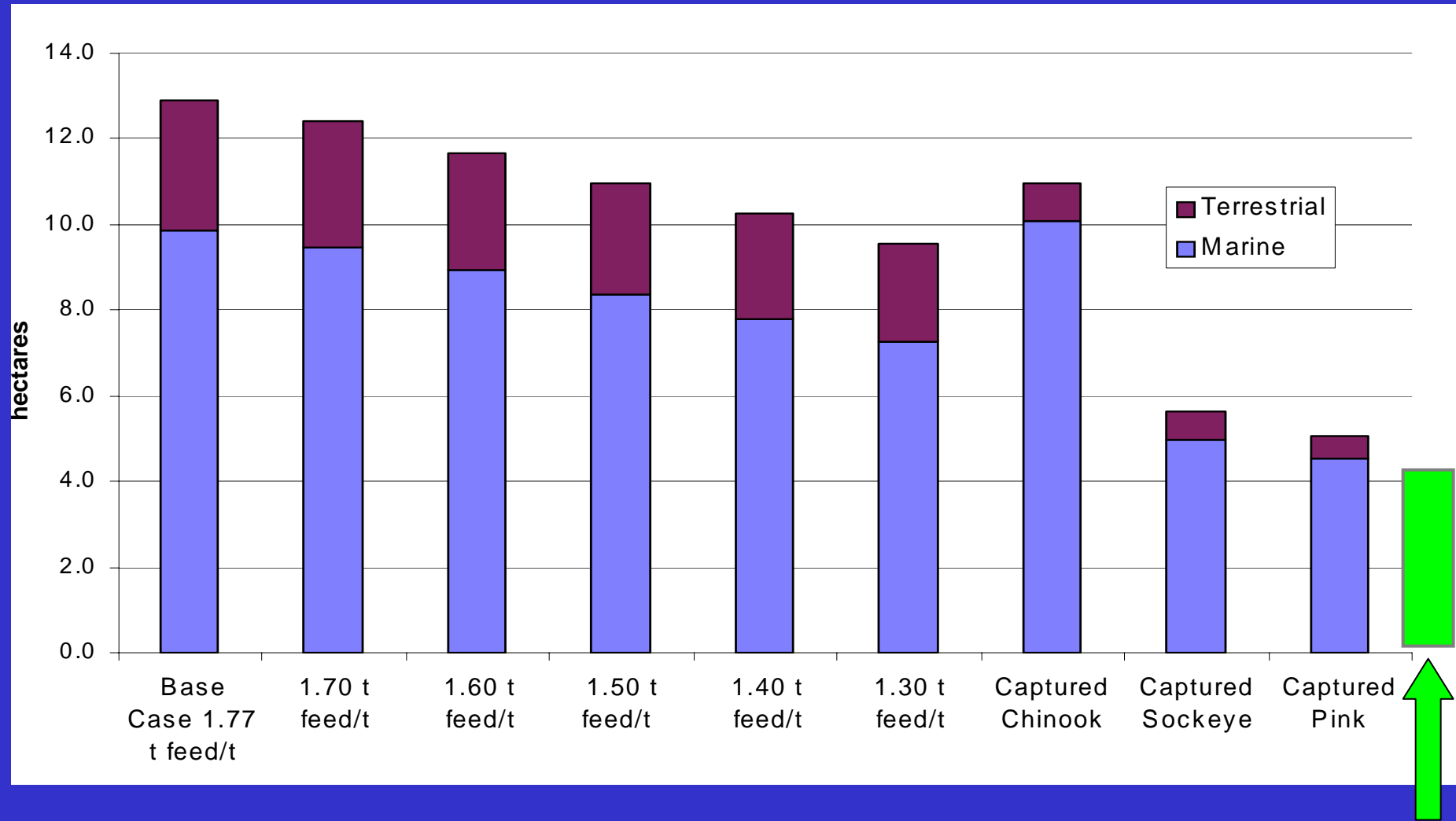
Figure 19. Ecological Footprint Required to Produce One Tonne of Intensively Cultured Atlantic Salmon Using a Range of Total Feed Use Rates (Tyedmers PhD thesis)

EFFICIENCY OF FARMED FISH



CURRENT EFFICIENCY OF FARMED ATLANTIC SALMON -ROUND

EFFICIENCY OF FARMED FISH



EFFICIENCY OF FARMED SALMON DELIVERED TO MARKET

Feed Conversion (fish meal correction)

Wild salmon (FC = 2.5:1, dry basis-protein)

Fish meal 100% protein

$$2.5 (100\%) / 100 : 1 (100\%) / 100 = \underline{\underline{2.5:1}}$$

Cultured salmon (FC = 2.7:1, dry basis-protein)

Ration is 25-35% fish meal 30%


Fish meal 70% protein

Fish meal 10% water

$$(30\%) (70\%) (90\%) = 19\%$$

$$2.7 (19\%) / 100 : 1 (100\%) / 100 = \underline{\underline{0.5:1}}$$

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Performance Based standards

The application of performance based standards has greatly reduced the pollution from organic wastes as a result of exceeding carrying capacity.



PBS have been used very successfully on both the east and west coasts of Canada

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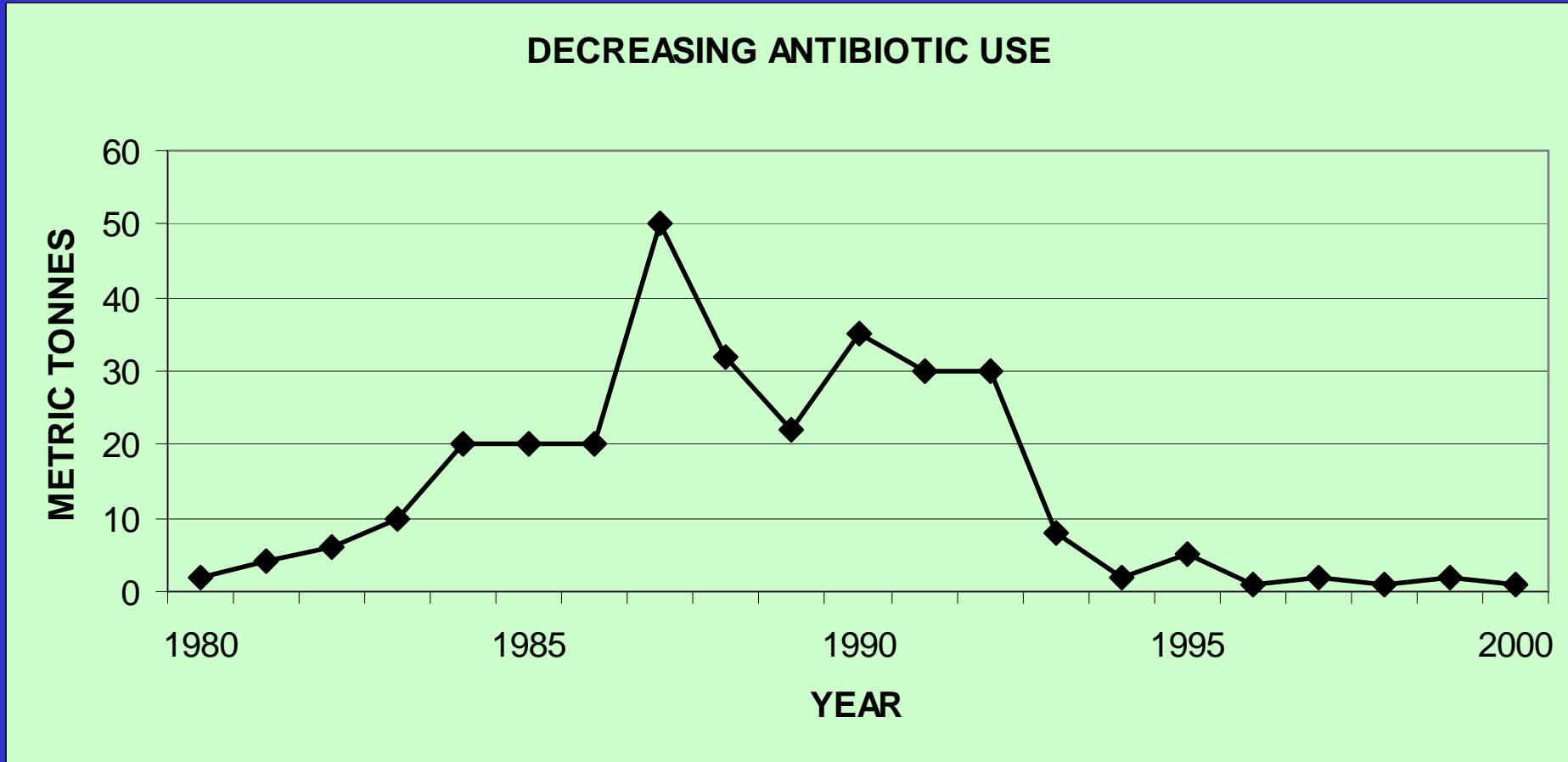
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Better Vaccines and Better Husbandry and better management has lead to a rapid decline in antibiotic use.

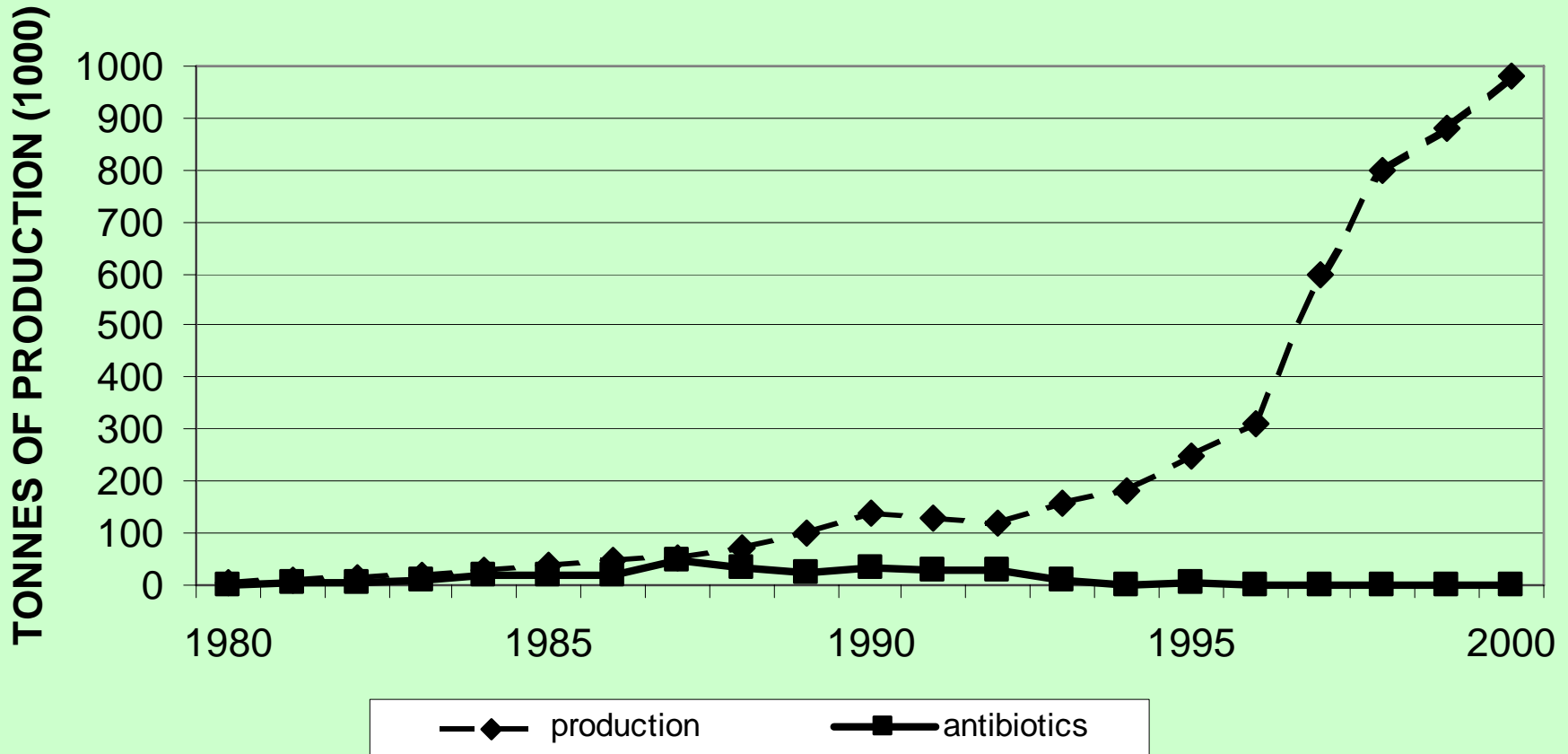


Trends in aquaculture production and antibiotic use

Data to 1996 from "State of World Aquaculture FAO 1997 (R. Subasinghe) 1996 to 2000 estimated

**Even with large increases in production
antibiotic use remains negligible.**

PRODUCTION VS ANTIBIOTIC USE



Trends in aquaculture production and antibiotic use

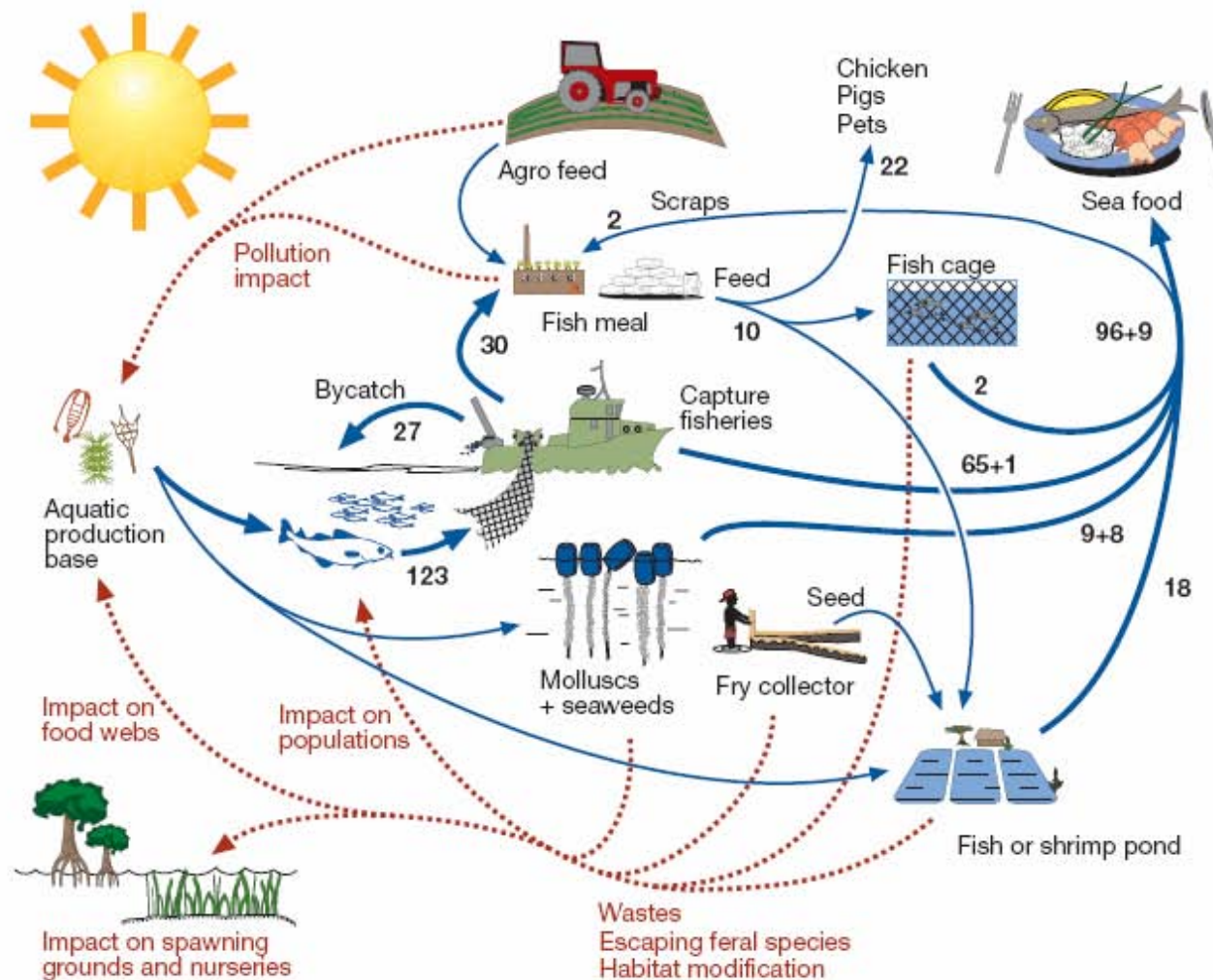
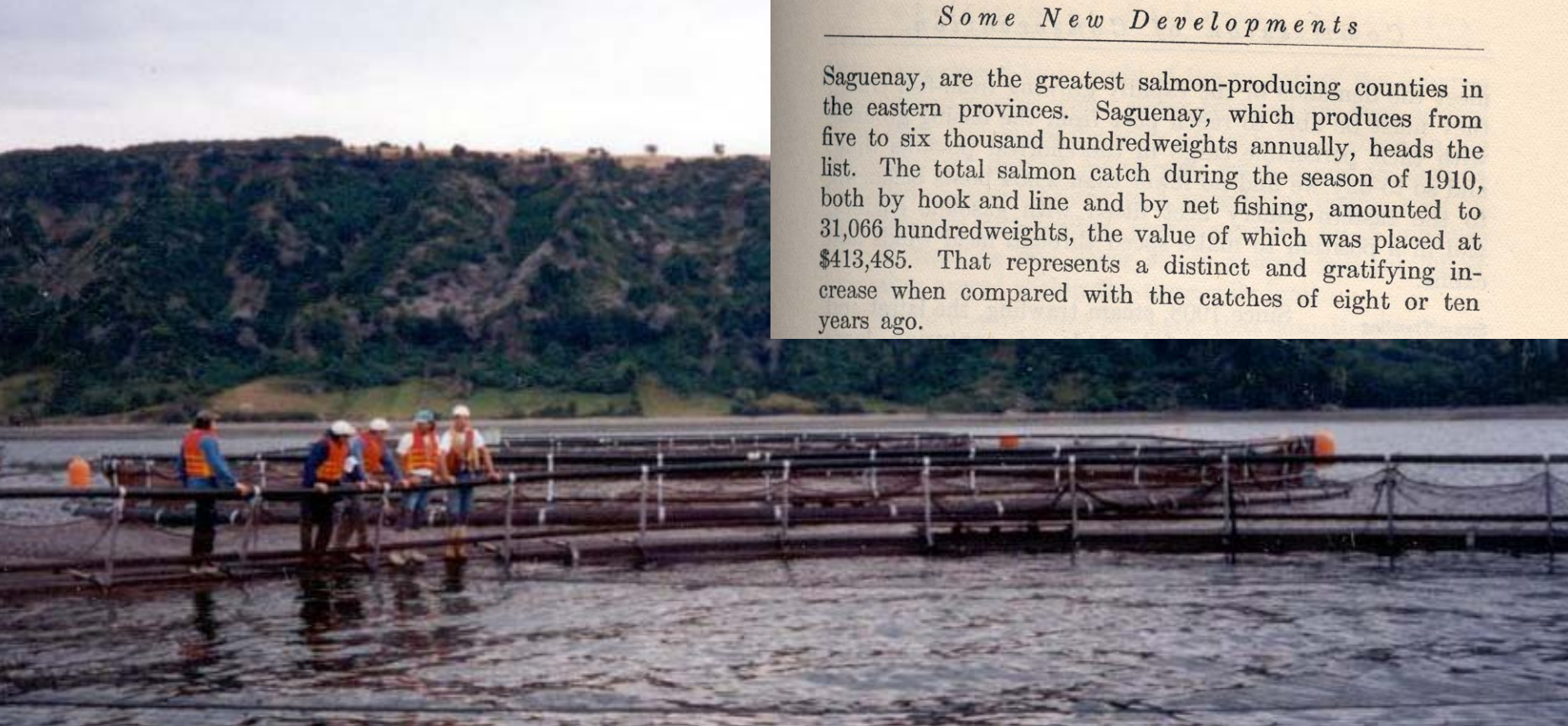


Figure 2 Ecological links between intensive fish and shrimp aquaculture and capture fisheries. Thick blue lines refer to main flows from aquatic production base through fisheries and aquaculture to human consumption of seafood. Numbers refer to 1997 data






and are in units of megatons (million metric tonnes) of fish, shellfish and seaweeds. Thin blue lines refer to other inputs needed for production. Hatched red lines indicate negative feedbacks.

Saguenay, are the greatest salmon-producing counties in the eastern provinces. Saguenay, which produces from five to six thousand hundredweights annually, heads the list. The total salmon catch during the season of 1910, both by hook and line and by net fishing, amounted to 31,066 hundredweights, the value of which was placed at \$413,485. That represents a distinct and gratifying increase when compared with the catches of eight or ten years ago.



This farm in Chile will grow as much Atlantic salmon in one year as the entire commercial catch of Atlantic salmon on the east coast in 1910. 3,100,000 lbs

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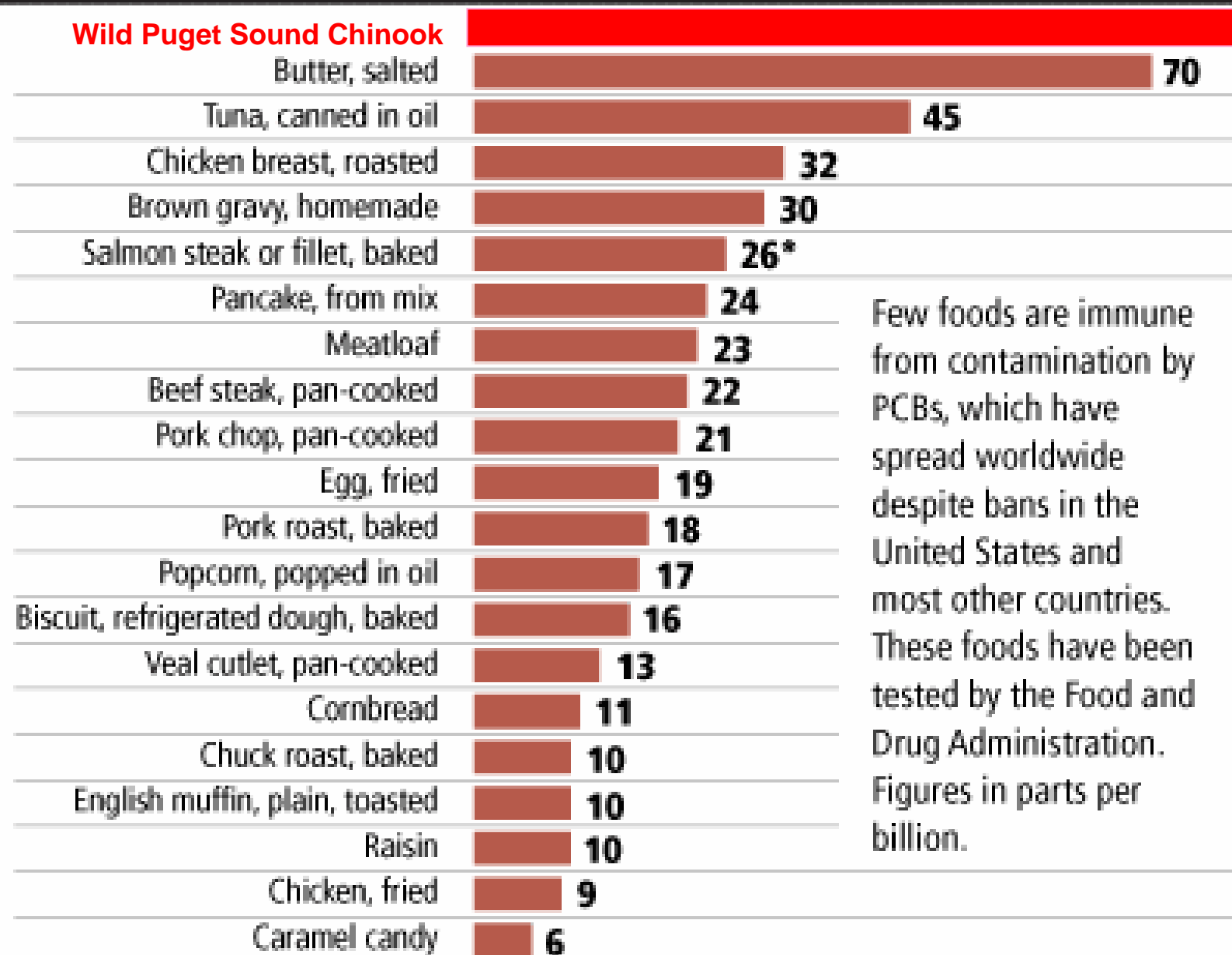
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PCB LEVELS IN OTHER FOODS



Few foods are immune from contamination by PCBs, which have spread worldwide despite bans in the United States and most other countries. These foods have been tested by the Food and Drug Administration. Figures in parts per billion.

*Puget Sound salmon tested higher.

Source: FDA

1 - O'Neil et al 1998

SEATTLE POST-INTELLIGENCER



Supply local marine foodstuffs that come from sustainable stock, which is not normally used as human food and/or by-products from species not used as human foods

Feeding is done very carefully using underwater video cameras to watch the fish feed and feeding is stopped once the fish are satiated.



THE END

**THANKS
FOR
LISTENING**



**YAH
THANKS**

